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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TSUKERMAN, LARISA Z

ART UNIT	PAPER NUMBER
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2833

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

09/710,539

Applicant(s)

ELDRIDGE ET AL.

Examiner

Larisa Z. Tsukerman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment dated 07/13/2005.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-6, 13, 14, 17, 19, 21, 25, 38, 41, 48, 51, 71-82 and 105-132 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 3-6, 13, 14, 17, 19, 21, 25, 38, 41, 48, 51, 71-82 and 105, 108-113, 116-119, 122--124, 127-132 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☒ Claim(s) 114, 115, 125 and 126 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 09 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.
 5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Newly submitted claims 114, 115 and 125, 126 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 114, 115 and 125, 126, drawn to method of forming a spring contact structure, classified in class 29.
- II. Claims 1-113, 116-124, 127-132, drawn to a spring contact structure, classified in class 439, subclass 66.

The inventions are distinct, each from the other because of the following reasons:

1) Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case a claimed spring contact structure can be made stamp, cut and bending.

Because these inventions are distinct for the reason given above and the search required for Group I is not required for Group II.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 114, 115 and 125, 126 withdrawn from

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consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 19, 25, 38, 41, 48, 71 – 73, 108 – 113 and 116 - 118, 124, 127-130 are rejected under 35 U.S.C. 102(b) as being anticipated by Grabbe et al. (5152695).

In regard to claim 71, Grabbe et al. discloses a microelectronic spring structure 10 comprising:

a base 20 secured to a terminal 12 of an electronic component 14; and
a beam 22 extending from the base 20 and spaced from the electronic component 14, wherein a cross-sectional width of the beam 22 comprises a contour that increases at least one of an area moment of inertia of the beam, a stiffness of the beam, and a spring force of the beam relative to a beam having an equivalent mass per unit length but lacking the contour.

The beam 22 has area with increasing moment of inertia of the beam, a stiffness of the beam, and a spring force of the beam relative to a beam having an equivalent mass per unit length but lacking the contour. Moment of inertia is bigger in wider portion of the beam and in bend portion of the beam. Examiner considers that Claim 71 reads on Grabber reference.

In regard to claim 19, Grabbe et al. disclose the beam 22 is contoured in a lengthwise direction (see Fig. 3).

In regard to claim 25, Grabbe et al. disclose the beam 22, in a lengthwise sectional view, has a stepped portion (see Fig. 1; next to numeral 24).

In regard to claim 38, Grabbe et al. disclose the base 20 and the beam 22 are integrally formed (see Fig.1).

In regard to claim 41, Grabber al. disclose the microelectronic spring structure 10, wherein the beam 22, viewed in a direction normal to the electronic component, is tapered so as to have a generally triangular shape 34 (see Fig. 4).

In regard to claim 48, Grabber et al. disclose the microelectronic spring structure 10, wherein the base 20 and the beam 22 are integrally formed (see Fig.3) and comprise a resilient material (see Clams 3 and 4; since each spring contact 10 is preferably made of a highly elastic material, beryllium copper, each spring contact 10 can be pushed down at the tip 34 and deformed, but will not plastically deform), as claimed.

In regard to claims 72 and 73, Grabber et al. disclose that electronic component 46 is many integrated circuit chips that can read as a semiconductor die from a plurality of semiconductor dice composing an unsingulated semiconductor wafer (see Col.2, line 59).

In regard to claim 116, Grabber et al. disclose an electronic component 14 comprising: a terminal 12 disposed on the electronic component 14 and providing signal input and/or output to the electronic component; and an electrically conductive contact structure 10 having two ends, wherein:

a first of the ends comprises a base 20 secured to the terminal 12,
a beam portion 22 of the contact structure 10 extends away from the electronic component and terminates in the second end (see Fig.1), and
a geometric shape of a cross-sectional width of the beam 22 is inherently asymmetrical with respect to an axis about which a mass distribution of the beam at the cross-sectional width is symmetrically distributed (any change in shape which convert a symmetrical figure into asymmetrical figure leads to change a center of mass).

In regard to claim 117, Grabber et al. disclose that the cross-sectional width is perpendicular to a length of the beam 22 from the first end to the second end.

In regard in claim 118, Grabber et al. disclose the cross-sectional width is perpendicular to a contour of the beam from the first end to the second end.

In regard to claim 124, Grabber et al. disclose the contact structure 10 comprises an integrally formed, single structure, as claimed.

Claims 74, 77 – 80, 82 and 105 are rejected under 35 U.S.C. 102(b) as being anticipated by Klowles (4017143)

In regard to claim 74 and 105, Knowels discloses an electronic component 36, 48 comprising:

a terminal 40; and

a contact structure 10 comprising: a base 14 secured to the terminal 40; and a beam 16 extending from the base 14 and spaced from the electronic component 36, 48;
a cross-sectional width of the beam 16 contoured in a "V" shape (see Fig. 9).

In regard to claim 77, Knowels discloses the beam 16 is contoured along a length thereof.

In regard to claim 78, Knowels discloses the beam 16 has a generally triangular shape (see Fig. 20).

In regard to claim 79, Knowels discloses the base 14 and the beam 16 are integrally formed.

In regard to claim 80, Knowels discloses the base 14 and the beam 16 comprise a resilient material (see Fig.3, since each spring contact 10 is preferably made of a highly elastic material, each spring contact 10 can be pushed aside at the tip 22 and deformed, but will not plastically deform).

In regard to claim 82, Knowels discloses a plurality of the terminals 40 and a plurality of the contact structures 10.

Claims 116, 131 and 132 are rejected under 35 U.S.C. 102(b) as being anticipated by Dozier, II et al. (5772451).

In regard to claim 116, Dozier, II et al. disclose an electronic component 300,310, 304 comprising:

a terminal 312 disposed on the electronic component 300, 310, 304 and providing signal input and/or output to the electronic component; and

an electrically conductive contact structure 320, 320b, 320a having two ends, wherein:

a first of the ends comprises a base 320a secured to the terminal 312,

a beam portion 320 of the contact structure extends away from the electronic component and terminates in the second end (see Fig.3), and

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a geometric shape of a cross-sectional width of the beam 320 is inherently asymmetrical with respect to an axis about which a mass distribution of the beam at the cross-sectional width is symmetrically distributed (any change in shape which convert a symmetrical figure into asymmetrical figure leads to change a center of mass).

In regard to claims 131 and 132, Dozier, II et al. disclose that electronic component 300, 310, 304 is a semiconductor die from a plurality of semiconductor dice composing an unsingulated semiconductor wafer (see Col.8, lines 54-60, Col.9, lines 24-36, and Col.23, lines 33-45).

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 71, 21, 74, 77 – 80 and 82 are rejected under 35 U.S.C. 102(e) as being anticipated by Fijten et al. (6113440).

In regard to claim 71, Fijten et al. disclose a microelectronic spring structure 1, PCB (not shown) comprising:

a base 15, 16 secured to a terminal (not shown, PCB with terminals, see Col.3, line 62) of an electronic component 1; and

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a beam 7, 8 extending from the base 15, 16 and spaced from the electronic component 1, wherein a cross-sectional width of the beam 7, 8 comprises a contour (area 9) that increases at least one of an area moment of inertia of the beam, a stiffness of the beam, and a spring force of the beam relative to a beam having an equivalent mass per unit length but lacking the contour.

In regard to claim 21, Fijten et al. disclose the cross-sectional width of beam 7, 8 is generally "V"- shaped (see Fig.4).

In regard to claim 74, Fijten et al. disclose an electronic component 1, PCB (not shown) comprising:

a terminal (not shown, PCB with terminals, see Col.3, line 62); and

a contact structure 5 comprising: a base 15, 16 secured to the terminal (see Col.3, line 60-62); and a beam 7, 8 extending from the base 15, 16 and spaced from the electronic component;

a cross-sectional width of the beam 7 contoured in a "V" shape (see Fig. 8).

In regard to claim 77, Fijten et al. disclose the beam 7, 8 is contoured along a length thereof.

In regard to claim 78, Fijten et al. disclose the beam 7, 8 has a generally triangular shape (see Fig. 4).

In regard to claim 79, Fijten et al. disclose the base 15, 16 and the beam 7, 8 are integrally formed.

In regard to claim 80, Fijten et al. discloses the base 15, 16 and the beam 7, 8 comprise a resilient material (see Abstract, since each spring contact 5 is preferably

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made of a highly elastic material, each spring contact 5 can be pushed down at the tip (not marked) and deformed, but will not plastically deform).

In regard to claim 82, Fijten et al disclose a plurality of the terminals 40 and a plurality of the contact structures 10.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 - 8, 13 – 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grabber et al. (5152695).

In regard to claims 3 - 8, 13 – 14, 17 and 26, Grabber et al. discloses the instant claimed invention except for the beam comprises various dimensions, such as an unloaded height over the electronic component, a width, a length, elastic deflection ratio, elastic range, spring rate and deflection ranges. It would have been obvious to have the beam comprises various dimensions, materials, springs rate and deflection ranges, since such a modification would have involved a mere change in the shape and material of a component. A change in shape and material is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669 USPQ 47 (CCPA 1966) and *In re Leshin*, 125 USPQ 416.

Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Grabber et al. (5152695) in view of Smith et al. (5613861).

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In regard to claim 51, Grabber et al. disclose most of the invention, including that the base 20 and the beam 22 are integrally formed, but lack that the spring contact comprise a layer of an electrically conductive seed material and a layer of electroplated metallic material. However, Smith et al. teach a spring contact comprising a layer of an electrically conductive seed material and a layer of electroplated metallic material 19 (gold, see Fig.13 and Col.8, lines 57-62) in order to reduce the resistance in the spring contacts 15.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a layer of an electrically conductive seed material and a layer of electroplated metallic material element in structure of Grabber, as taught by Smith et al., in order to reduce the resistance in the spring contacts.

Claims 71 – 76 and 119 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dozier, II et al. in view of Morris (6309262).

In regard to claim 71, Dozier, II et al. disclose a microelectronic spring structure 320, 320a, 320b comprising:

a base 320a secured to a terminal 312 of an electronic component 300, 310, 304; and a beam 320 extending from the base 320a and spaced from the electronic component 310. However, Dozier II, et al. lacks that a cross-sectional width of the beam 320 comprises a contour that increases at least one of an area moment of inertia of the beam, a stiffness of the beam, and a spring force of the beam relative to a beam having an equivalent mass per unit length. Morris teaches a beam 402 contoured in a "V/U" shape (see Fig 5) to minimized the contact area and produce high contact pressure,

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and also increases a stiffness of the beam. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the "V/U" shaped beam in structure of Dozier, II et al., as taught by Morris, in order to minimized the contact area and produce high contact pressure and when modified would comprise a cross-sectional width of the beam 320 that increases at least one of an area moment of inertia of the beam, a stiffness of the beam, and a spring force of the beam relative to a beam having an equivalent mass per unit length.

In regard to claims 72 and 73, Dozier, II et al. disclose that electronic component 300, 310, 304 is a semiconductor die from a plurality of semiconductor dice composing an unsingulated semiconductor wafer (see Col.8, lines 54-60, Col.9, lines 24-36, and Col.23, lines 33-45).

In regard to claims 74 and 119, 122, Dozier, II et al. disclose an electronic component 300, 310, 304 comprising:

- a terminal 312; and

- a contact structure 320, 320b, 320a comprising: a base 320a secured to the terminal 312; and a beam 320 extending from the base 320a and spaced from the electronic component.

However, Dozier, II et al. lacks a cross-sectional width of the beam contoured in a one of a "V" shape, a "U" shape, and a shape comprising an extension that forms a rib; or arc. Morris teaches a beam 402 contoured in a "V/U" shape (see Fig 5) to minimized the contact area and produce high contact pressure, and also increases a stiffness of the beam. Therefore, it would have been obvious to one having ordinary skill in the art at

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the time the invention was made to use the "V/U" shaped beam in structure of Dozier, II et al., as taught by Morris, in order to minimized the contact area and produce high contact pressure and when modified inherently would comprise a cross-sectional width of the beam 320 that increases at least one of an area moment of inertia of the beam, a stiffness of the beam, and a spring force of the beam relative to a beam having an equivalent mass per unit length.

In regard to claims 75 and 76, Dozier, II et al. disclose that electronic component 300, 310, 304 is a semiconductor die from a plurality of semiconductor dice composing an unsingulated semiconductor wafer (see Col.8, lines 54-60, Col.9, lines 24-36, and Col.23, lines 33-45).

Claim 81 is rejected under 35 U.S.C. 102(b) as being anticipated by Fijten et al. (6113440) in view of Smith et al. (5613861)

In regard to claim 81, Fijten et al. discloses most of the claimed invention, except for the base 15, 16 and the beam 7,8 comprise a layer of an electrically conductive seed material and a layer of electroplated metallic material. However, Smith et al. teach a base 12 and a beam 11 comprise a layer of an electrically conductive seed material and a layer of electroplated metallic material 19 (see Fig.13), which shows a layer of gold 19 plated over the outer surface of each spring contact 15. The layer of gold 19 is preferably used to reduce the resistance in the spring contacts 15, but can be replaced with any other conductive material. Preferably, the gold layer 19 is plated on the spring contacts 15 using an electroless plating process).

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Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a layer of an electrically conductive seed material and a layer of electroplated metallic material element in structure of Fijten et al., as taught by Smith et al., in order to reduce the resistance in the spring contacts.

Response to Arguments

Applicant's arguments with respect to claims 3,6,8,13,14,17,19,21,25,38,41,48, 51 and 71-82 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Larisa Z Tsukerman whose telephone number is (571)-272-2015. The examiner can normally be reached on Monday through Friday from 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paula A Bradley can be reached on (571)-272-2800 ex. 33. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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11/02/2005


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